FLOOD INSURANCE STUDY

CITY OF ORMOND BEACH, FLORIDA

VOLUSIA COUNTY

JUNE 4, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 125136

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Authority and Acknowledgments	1
	1.3 Coordination	2
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2.3 Principal Flood Problems	2
	2.4 Flood Protection Measures	4
3.0	ENGINEERING METHODS	4
	3.1 Hydrologic Analyses	4
	3.2 Hydraulic Analyses	6
4.0	FLOODPLAIN MANAGEMENT APPLICATIONS	11
	4.1 Floodplain Boundaries	11
	4.2 Floodways	12
5.0	INSURANCE APPLICATION	14
6.0	FLOOD INSURANCE RATE MAP	15
7.0	OTHER STUDIES	15
8.0	LOCATION OF DATA	15
9.0	REFERENCES AND BIBLIOGRAPHY	15

TABLE OF CONTENTS (continued)

Page

FIGURES

Figure 1 - Vicinity Map 3

Figure 2 - Transect Location Map 9

Figure 3 - Transect Schematic 11

Figure 4 - Floodway Schematic 14

TABLES

Table 1 - Summary of Discharges 5

Table 2 - Summary of Stillwater Elevations 7

Table 3 - Transect Locations, Stillwater Starting Elevations, and Initial Wave Crest Elevations 10

Table 4 - Floodway Data 13

EXHIBITS

Flood Profiles

Tomoka River	Panels 01P-03P
Shooting Range Canal	Panels 04P-05P
Eleventh Street Canal Tributary No. 2	Panel 06P
Eleventh Street Canal Tributary No. 2A	Panel 07P

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY

CITY OF ORMOND BEACH,
VOLUSIA COUNTY,
FLORIDA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and supersedes a previous Flood Insurance Study for the City of Ormond Beach, Florida (Reference 1). This information will be used by the community to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program. The information will also be used by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by the Federal Emergency Management Agency (FEMA) for purposes of the National Flood Insurance Program. The data were identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the National Flood Insurance Program. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, FEMA, Atlanta, Georgia, for consideration for revision of this study.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were obtained from the Flood Insurance Study for Volusia County, Florida (Reference 2) and from the "Tomoka River Flood Plain Management Study - Tributaries to the Tomoka River" (Reference 3).

1.3 Coordination

On [illegible], 1987, the results of this [illegible] Study were [illegible] accepted as a final coordination of any interest [illegible] elements of the community and FEMA.

2.0 [illegible]

2.1 [illegible]ography

The [illegible] Insurance Study covers the unincorporated area of the City of [illegible] Volusia County, Florida. The area to be studied is shown on the vicinity [illegible] Figure 1.

[illegible] was originally platted in [illegible] and was [illegible] [illegible] Avenue, the [illegible] Inlet, and [illegible] Canal [illegible] No. 2 was studied in detail within the community.

[illegible] flooding [illegible] the Atlantic Ocean [illegible] the City of [illegible] Creek. The [illegible] Ocean.

Approximate methods of analysis were used to study all remaining areas with a potential [illegible] but for which no more detailed engineering technical data available.

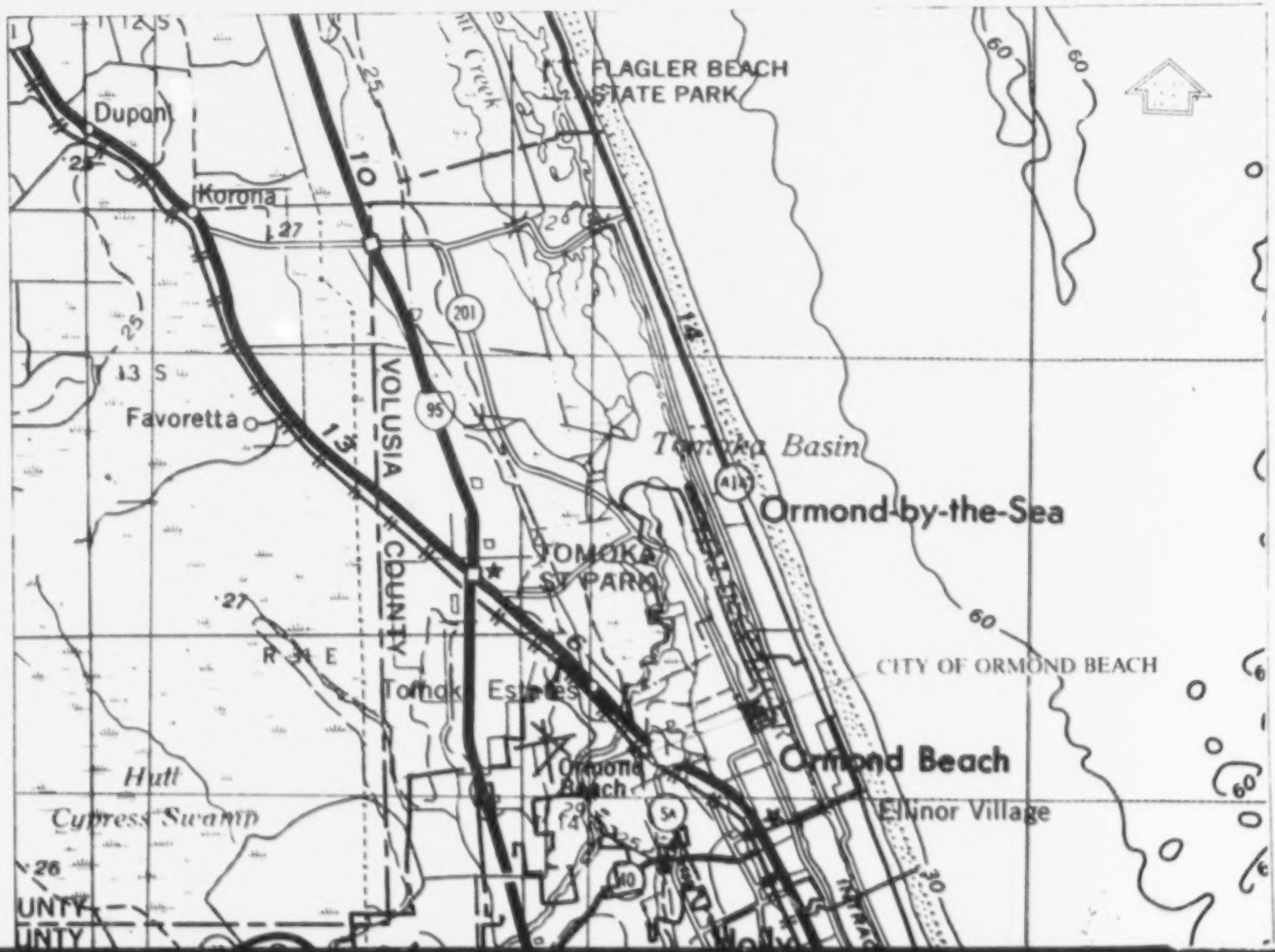
2.2 Community Description

[illegible] of Ormond Beach is in northeastern Volusia County. Ormond [illegible] is [illegible] by the Atlantic Ocean, on the south by the cities of Holly Hill and Daytona Beach of the same [illegible] areas in Volusia County, and on the north and west by the [illegible] Volusia County. The City is served by Interstate [illegible] to Florida [illegible] 8 and 20, and [illegible] State [illegible] [illegible] Beach [illegible] Daytona Beach [illegible] (Reference [illegible]).

Precipitation within the study [illegible] between 48 and 64 inches per year. The precipitation [illegible] is [illegible] in July. The annual mean temperature for Ormond Beach [illegible] approximately 70 degrees Fahrenheit.

2.3 Principal Source Features

Ormond Beach is subject to storm surge flooding as a result of hurricane and tropical storm activity. Flooding is caused by large tidal surges combined with wave action and the heavy rainfall that accompany these storms.


FLAGLER BEACH STATE PARK
Dupont
Korona
Favoretta
VOLUSIA COUNTY
Tomoka Basin
Ormond-by-the-Sea
TOMOKA ST PARK
CITY OF ORMOND BEACH
Tomoka Estates
Ormond Beach
Ormond Beach
Eilnor Village
Hull
Cypress Swamp
12 S
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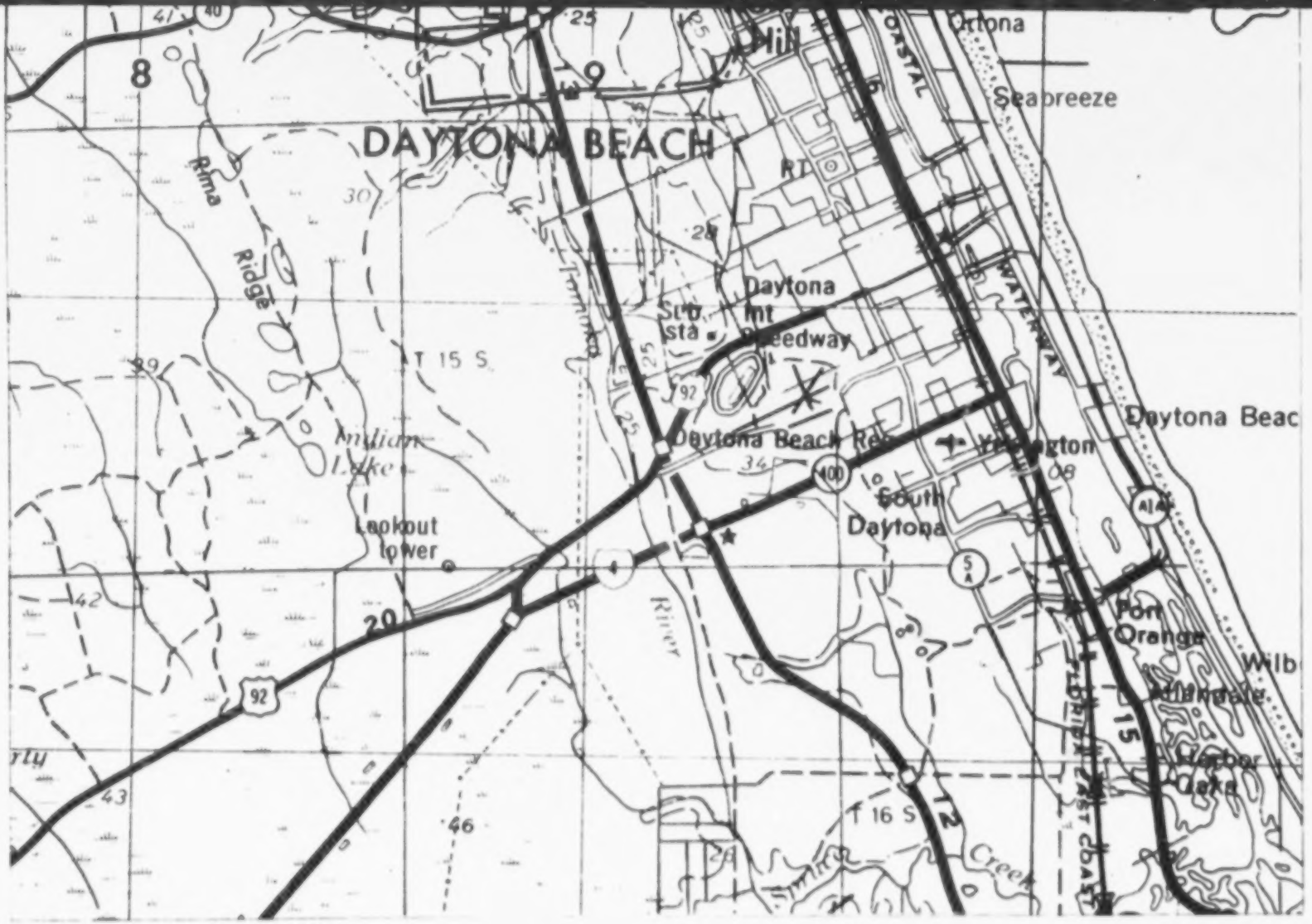


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

APPROXIMATE SCALE
0 2 4 6 MILES

VICINITY MAP

The Tomoka River, Shooting Range Canal, and Eleventh Street Canal Tributaries No. 2 and No. 2A are subject to flooding during periods of heavy rainfall.

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community. Analyses were also carried out to establish the peak elevation-frequency relationships for each coastal flooding source studied in detail.

Regionalized regression equations, developed by the U.S. Geological Survey in cooperation with the Florida Department of Transportation, were used for deriving peak discharge-frequency relationships for the Tomoka River, Shooting Range Canal, and Eleventh Street Canal Tributaries No. 2 and No. 2A studied in detail (Reference 5). Regionalized regression equations were slightly modified to represent the extensive swamp areas within the drainage basins of the streams by adjusting the lake storage term of the equation so that the computed peak discharges of 10-, 50-, 100-, and 500-year frequencies agree closely with the peak discharges resulting from the log-Pearson Type III analysis of the streamflow records. The procedures outlined in U.S. Water Resources Council Bulletin No. 17B (Reference 6) were used in applying log-Pearson Type III distributions to the observed streamflow records.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TOMOKA RIVER					
at mouth	136.23	3,342	5,777	6,999	10,356
at U.S. Route 1	126.36	3,181	5,502	6,666	9,851
SHOOTING RANGE CANAL					
at Interstate 95	0.50	100.4	188.2	232.7	361.9
ELEVENTH STREET CANAL TRIBUTARY NO. 2					
at confluence with Eleventh Street Canal	0.76	135.7	N/A	309.2	480.5
ELEVENTH STREET CANAL TRIBUTARY NO. 2A					
just upstream of confluence with Eleventh Street Canal Tributary No. 2	0.28	67.6	N/A	157.5	244.8

Inundation from the Atlantic Ocean caused by passage of storms (storm surge) was determined by the joint probability method (Reference 7). The storm populations were described by probability distributions of five parameters that influence surge heights. These parameters were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of observed storms in the vicinity of the City of Ormond Beach. Primary sources of data for this analysis were "Tropical Cyclones of the North Atlantic Ocean, 1871-1977," "Some Climatological Characteristics of Hurricanes and Tropical Storms, Gulf and East Coasts of the United States," and "Meteorological Criteria, for Standard Project Hurricane and Probable Maximum Hurricane Wind Fields, Gulf and East Coasts of the United States" (References 8-10).

For areas subject to flooding directly from the Atlantic Ocean, the [illegible] standard storm surge model was used to simulate the coastal surge generated by any chosen storm. [illegible] storm parameters defined previously. By performing such simulations for a number of storms, each of known total probability, the complete distribution of surge height can be established as a function of coastal location. These distributions incorporate the large-scale surge behavior, but do not include an analysis of the added effects associated with local small-scale wave phenomena, such as wave height or runup. As the final step in the calculations, the astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level (Reference 11).

A reanalysis of the hurricane storm surge for the Atlantic coast was performed by FEMA using the storm surge model SLOSH (Reference 12). The reanalysis was performed to model two breach locations near Ponce de Leon Inlet. The 1984 Thanksgiving Day northeaster, which caused high flooding in and around Ponce de Leon Inlet was also modeled by FEMA using SLOSH. These reanalyses showed significant increases in stillwater elevations near Ponce de Leon Inlet over the elevations shown in the previous Flood Insurance Study for Ormond Beach (Reference 1).

The stillwater elevations for the 10-, 50-, 100-, and 500-year floods have been determined for the City of Ormond Beach and are shown in Table 2, Summary of Stillwater Elevations. The analyses reported herein reflect the stillwater elevations due to tidal and wind setup effects, but do not include the contributions from wave action effects.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the riverine sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments studied in detail, selected cross-section locations are shown on the Flood Insurance Rate Map.

Water-surface elevations for the Tomoka River were developed using the WSP-2 water-surface profile computer model (Reference 13). Water-surface elevations for Spruce Creek, Range Canal and Eleventh Street Canal Tributaries No. 2 and No. 3 were developed using the WSP-2 water-surface profile computer model (Reference 13). Cross sections for the backwater analyses were obtained from field surveys (Reference 14).

Channel roughness coefficients (Manning's "n") used in the hydraulic computations were selected on the basis of field observation and aerial photographs of the streams and floodplain areas. Roughness values used for the channels ranged from 0.035 to 0.045 with overbank values ranging from 0.045 to 0.100.

FLOODING SOURCE AND TRANSECT	FLOODING INSURANCE RATE MAP PANEL	STILLWATER ELEVATION (FEET NGVD)				ZONE	BASE FLOOD ELEVATION (FEET NGVD)
		10 YEAR	50 YEAR	100 YEAR	500 YEAR		
ATLANTIC OCEAN							
1,2,3	0004,0008	5.7	7.2	8.0	10.8	VE	10 12
1,2,3	0004,0008	5.7	7.2	8.0	10.8	AE	8 10
HALIFAX RIVER/ INTRACOASTAL WATERWAY							
1,2,3	0001,0004,0008	2.7	4.2	5.0	7.8	AE	5 6
N.A.	0001,0004	2.1	3.4	4.0	5.4	AE	4

'ROUNDED TO THE NEAREST FOOT AND MAY INCLUDE EFFECTS OF WAVE ACTION
DUE TO MAP SCALE LIMITATIONS, BASE FLOOD ELEVATIONS SHOWN ON MAP MAY REPRESENT AVERAGE ELEVATIONS FOR THE ZONES DEPICTED

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

SUMMARY OF STILLWATER ELEVATIONS

ATLANTIC OCEAN—HALIFAX RIVER/INTRACOASTAL WATERWAY

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

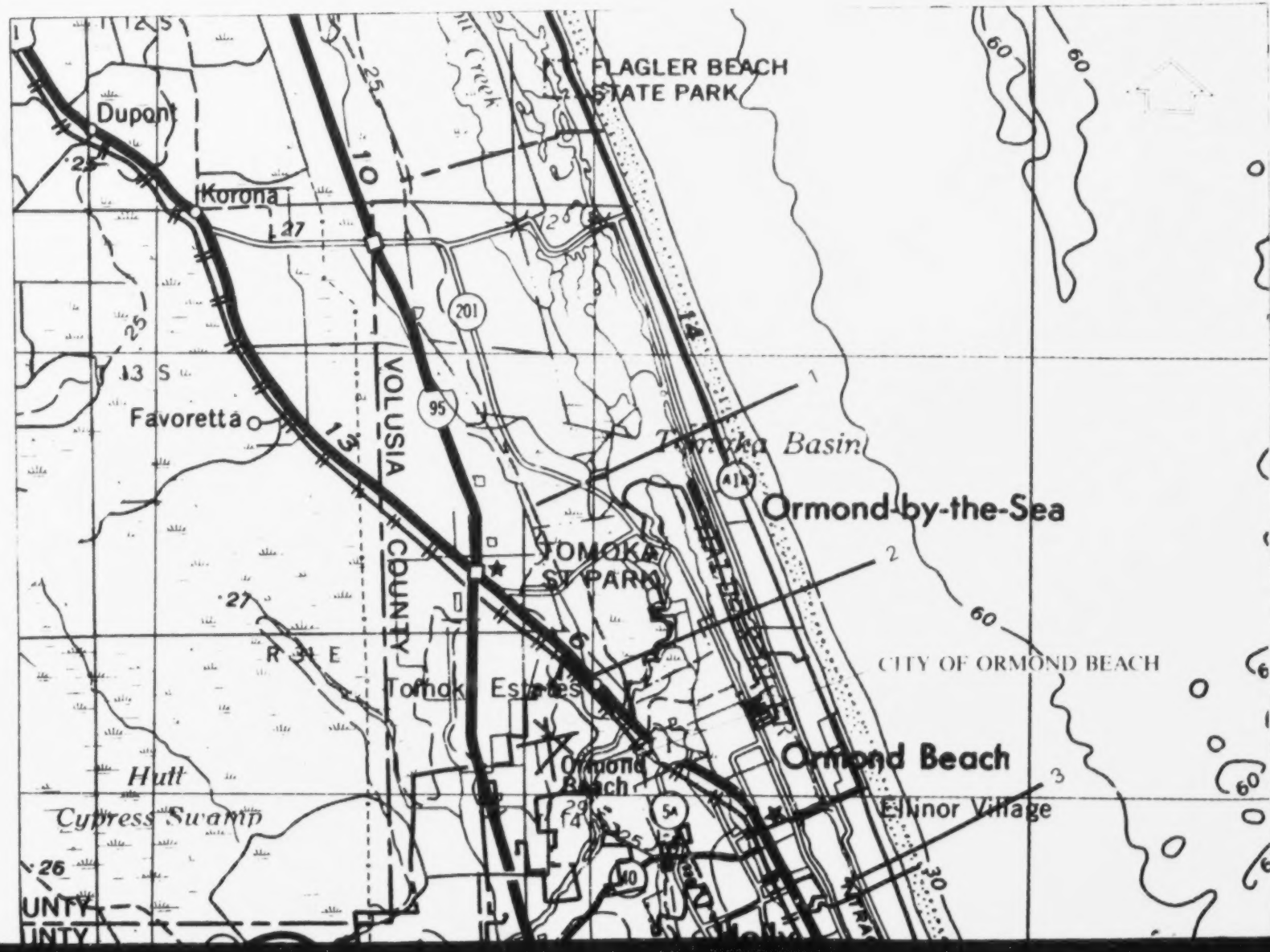
The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

The FEMA storm surge model (Reference 12) was used to simulate the hydrodynamic behavior of the surge generated by the various synthetic storms. This model utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 5 nautical miles, and 1,000 feet, depending on the resolution required.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the National Academy of Sciences (NAS) (Reference 16). This method is based on the following major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70-percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in the NAS report (Reference 16). The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 2, Transect Location Map, in accordance with the "Users Manual for Wave Height Analysis" (Reference 11). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at large intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects.


FLAGLER BEACH STATE PARK
Dupont
Korona
Favoretta
VOLUSIA COUNTY
TOMOKA ST PARK
Tomoka Basin
Ormond-by-the-Sea
CITY OF ORMOND BEACH
Tomoka Estates
Ormond Beach
Ormond Beach
Ellinor Village
Hull
Cypress Swamp
12 S
13 S
R 31 E
201
95
A1A
40
10
14
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6
5A
60
30

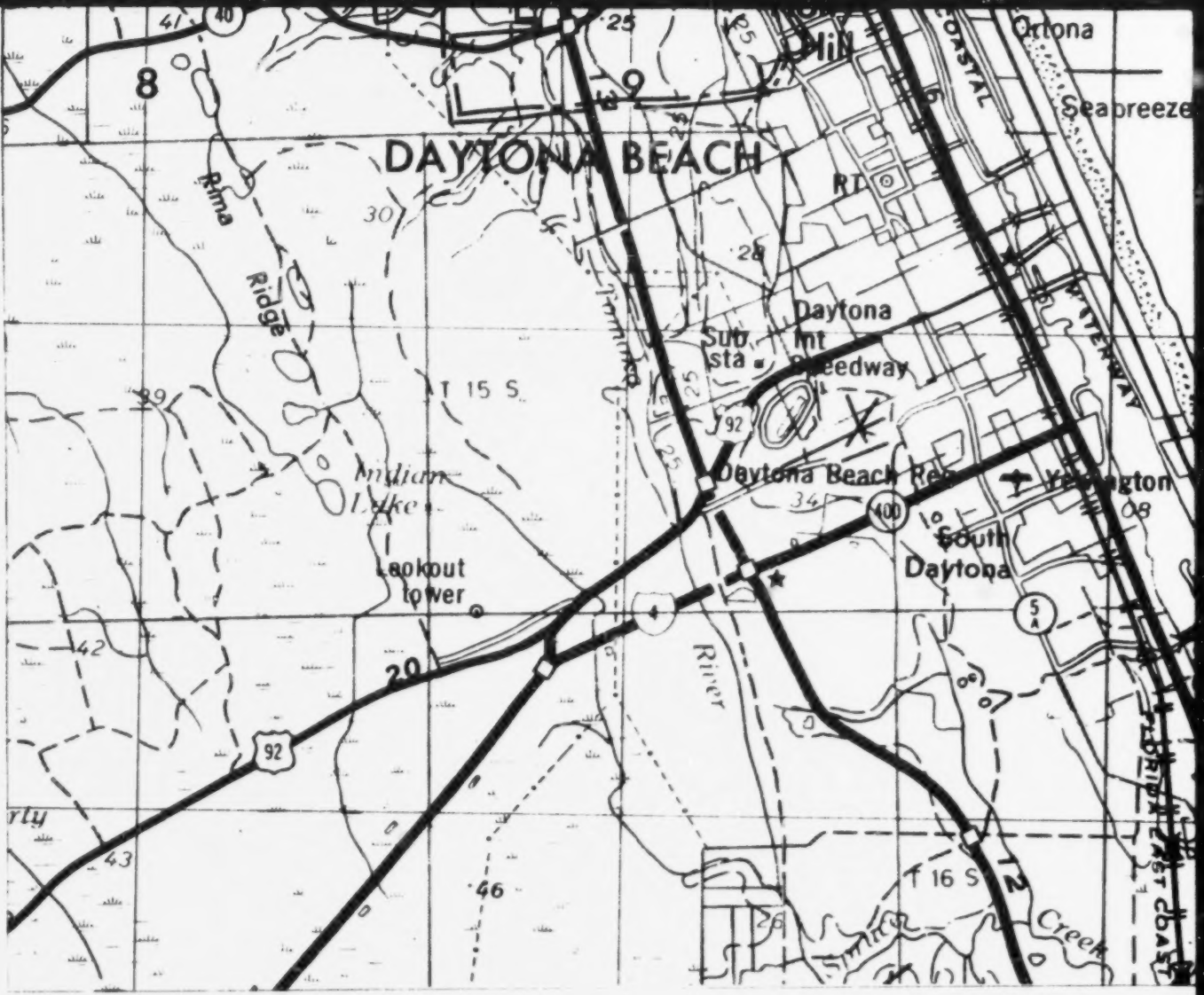

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

APPROXIMATE SCALE

0 2 4

TRANSECT LOCATION MA

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for the 100-year flood were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the 3-foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was also computed at each transect. Table 3 provides a listing of the transect locations and stillwater starting elevations, as well as initial wave crest elevations.

TABLE 3 - TRANSECT LOCATIONS, STILLWATER STARTING ELEVATIONS, AND INITIAL WAVE CREST ELEVATIONS

TRANSECT	LOCATION	ELEVATION (FEET) STILLWATER	ELEVATION (FEET) WAVE CREST
1	Between Marlin Drive and Beau Rivage Drive from the Atlantic coastline westward across the Halifax River/Intracoastal Waterway and Tomoka Basin floodplains	4.0[1]	5.0[1]
2	Between Ocean Edge Drive and Ocean View Drive from the Atlantic coastline westward across the Halifax River/Intracoastal Waterway floodplain into Ormond Beach between Red Cedar Court and Lavista	4.0[1]	5.0[1]
3	Between Arlington Way and Byron Ellinore Drive from the Atlantic coastline westward across the Halifax River/Intracoastal Waterway floodplain	8.0[2]	12.0[2]

[1]Halifax River/Intracoastal Water

[2]Atlantic Ocean

Figure 2 represents a sample transect that illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the V/A zone boundary.

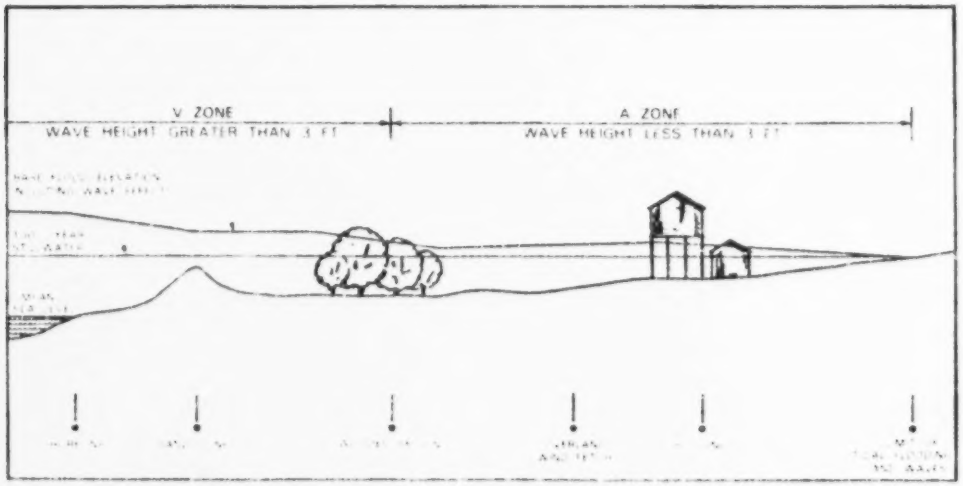

FIGURE 3 - Transect Schematic

After analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic maps (References 17 and 18), beach profiles (Reference 19), aerial photographs (References 20 and 21), and engineering judgment. Controlling features affecting the elevations were identified and considered in relation to their position at a particular transect and their variation between transects.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet (Reference 17). For each coastal flooding source studied in detail, the 100- and 500-year floodplain boundaries have been

delineated using the flood elevations determined at each transect. Between transect, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet (Reference 17).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the flooding sources studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 4, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway for the Tomoka River lie outside the corporate limits.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
TOMOKA RIVER								
A	3,909	1958[2]	6150	1.1	4.0	3.8[3]	4.7	0.9
B	13,334	2810[2]	14,219	0.5	4.4	4.4	5.4	1.0
C	17,409	2191[2]	11,999	0.6	4.5	4.5	5.5	1.0
D	21,609	857[2]	5828	1.1	4.9	4.9	5.8	0.9
E	23,669	541	4256	1.6	5.1	5.1	6.1	1.0
F	31,144	516[2]	4808	1.4	5.9	5.9	6.9	1.0
G	39,404	422	5315	1.3	6.4	6.4	7.4	1.0

[1]FEET ABOVE MOUTH
[2]THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS
[3]ELEVATIONS COMPUTED WITHOUT CONSIDERING STORM SURGE EFFECT FROM TOMOKA BASIN

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

FLOODWAY DATA

TOMOKA RIVER

point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

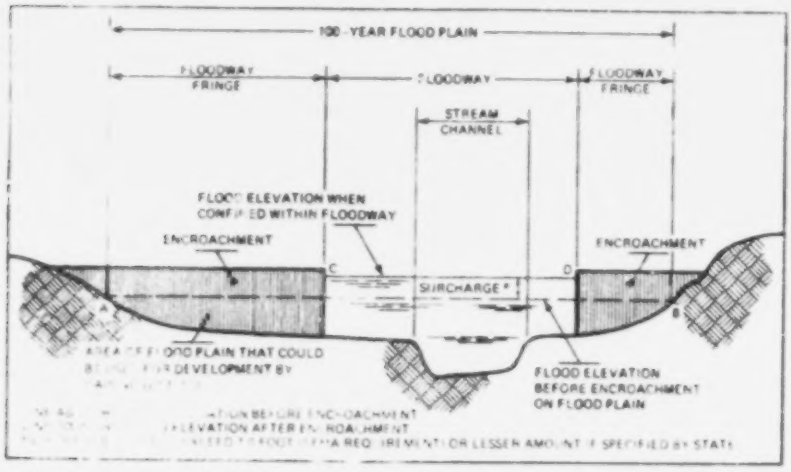

FIGURE 4 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

A Flood Insurance Study published for the City of Holly Hill, Florida (Reference 22) is in agreement with this study.

Flood Insurance Studies in progress for Volusia County and the City of Daytona Beach, Florida (References [illegible] and 23) are in agreement with this study.

This Flood Insurance Study supersedes the previously published Flood Insurance Study for the City of Ormond Beach (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

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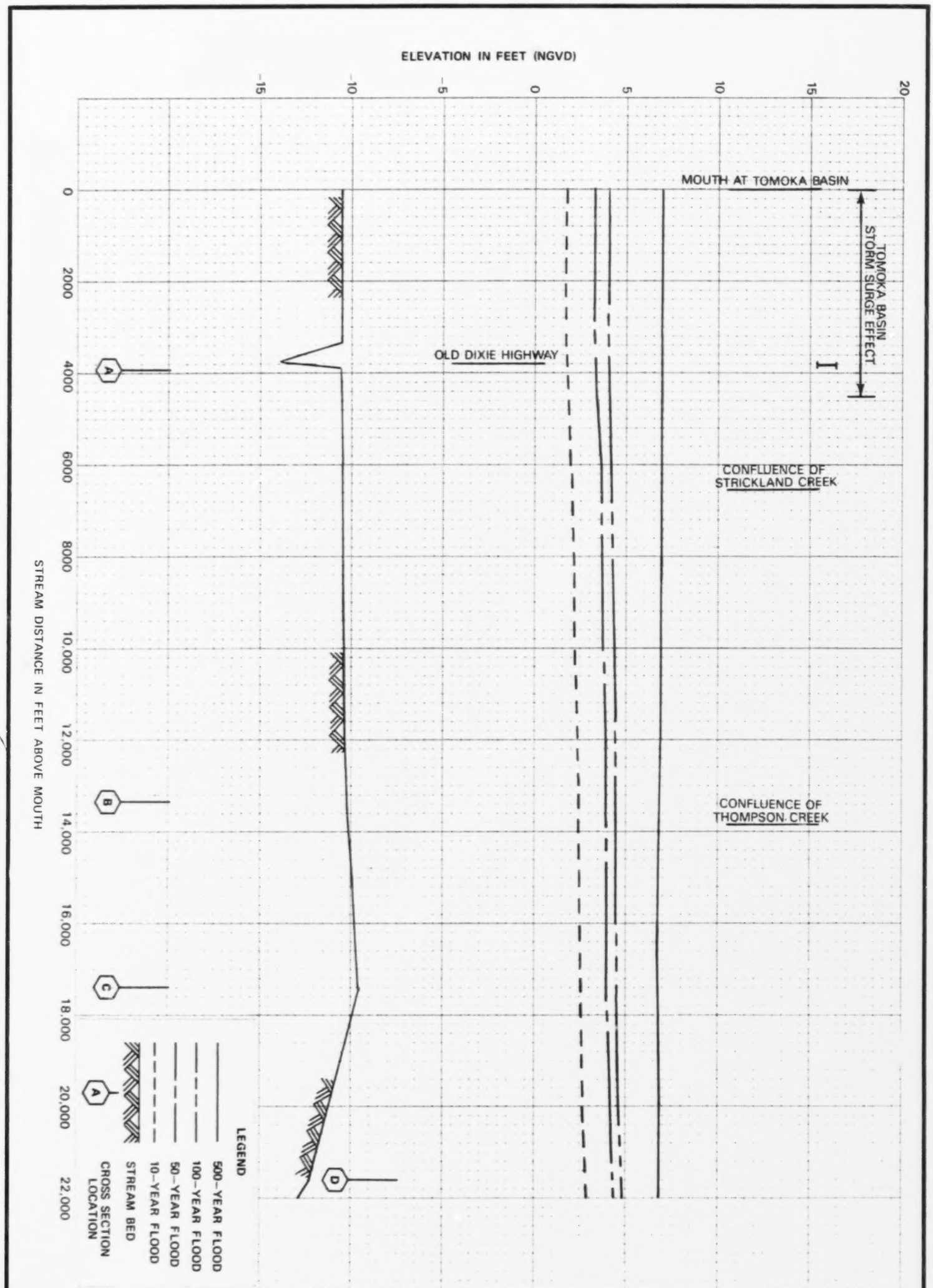

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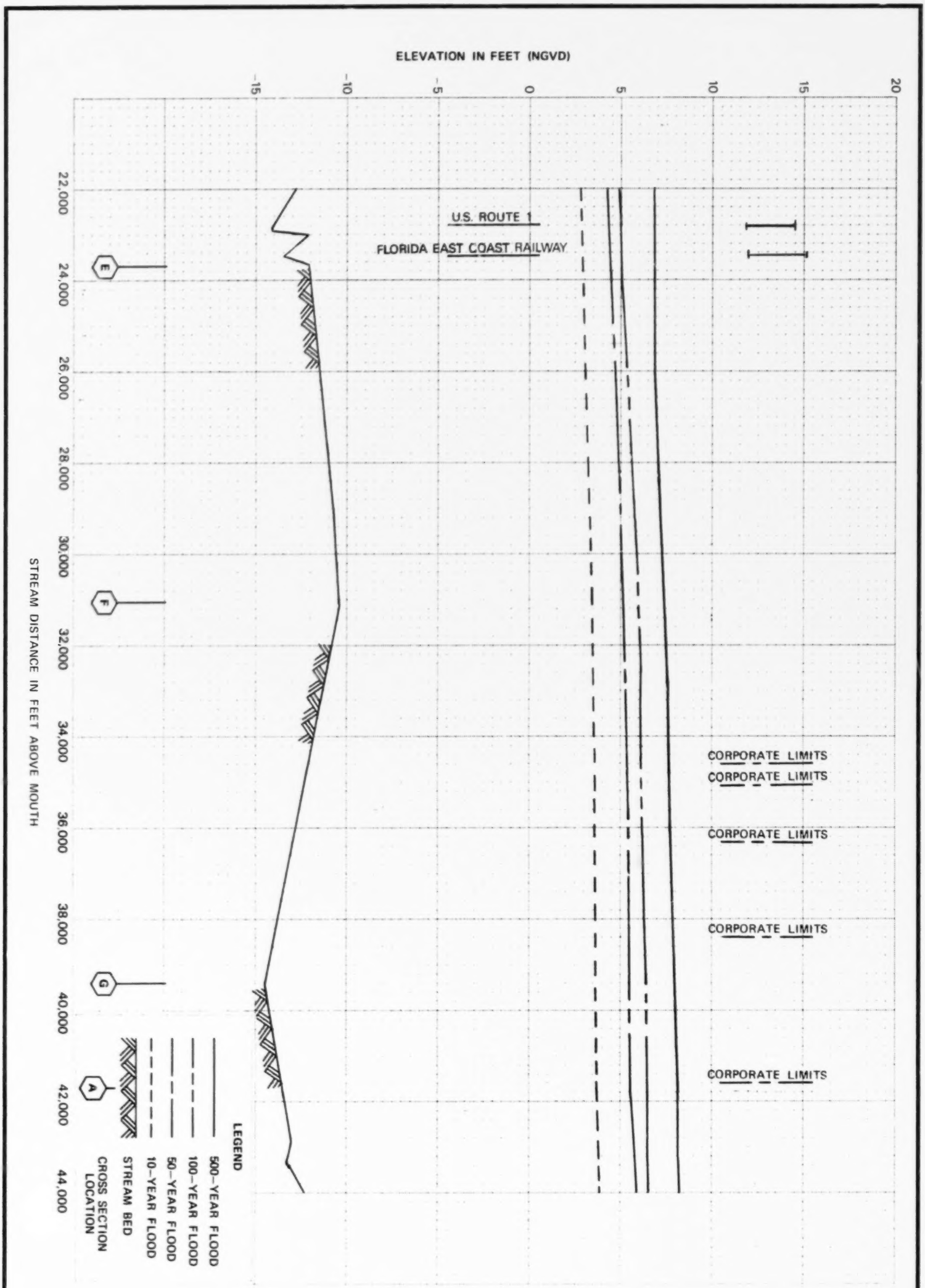

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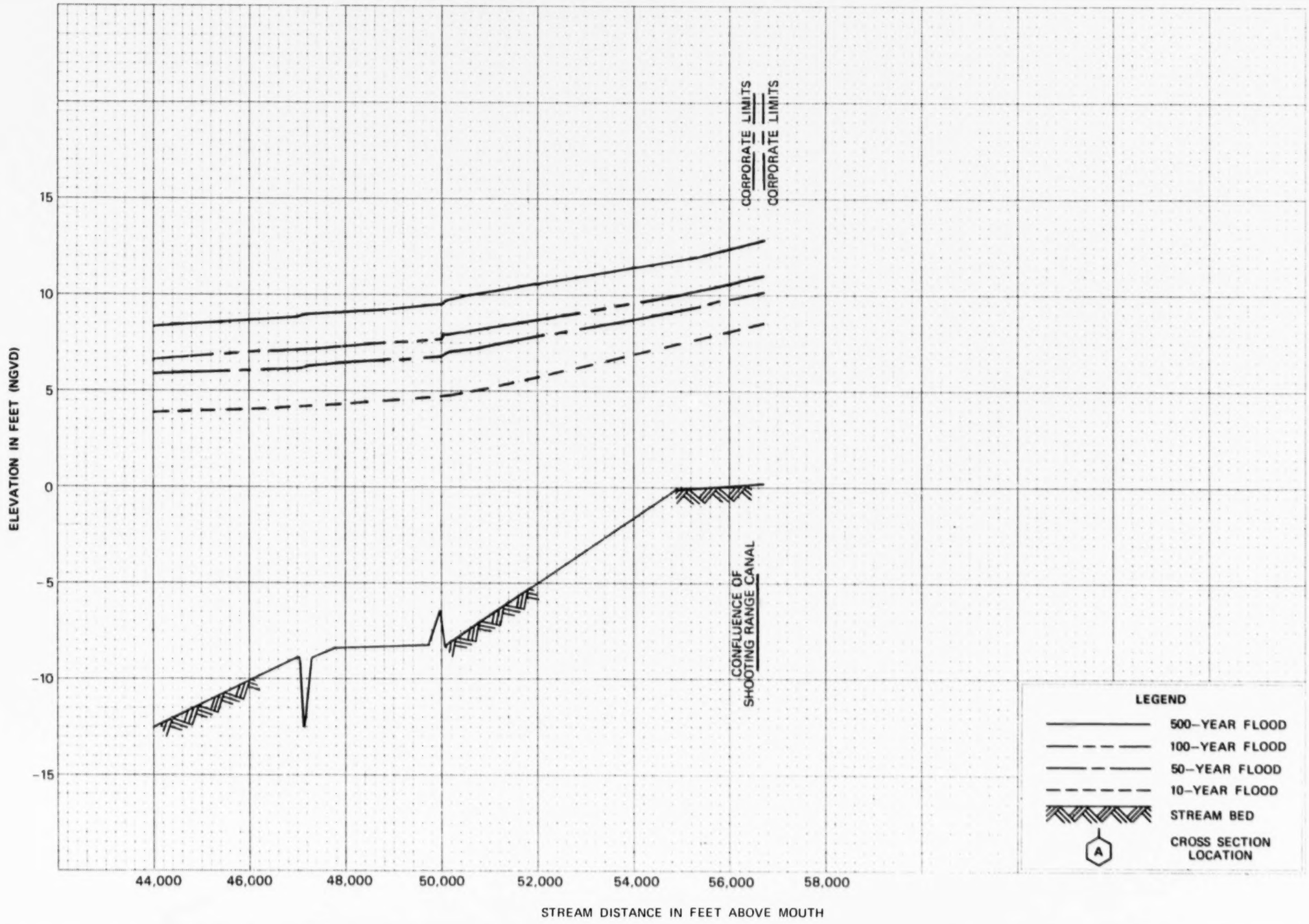
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

FLOOD PROFILES

TOMOKA RIVER



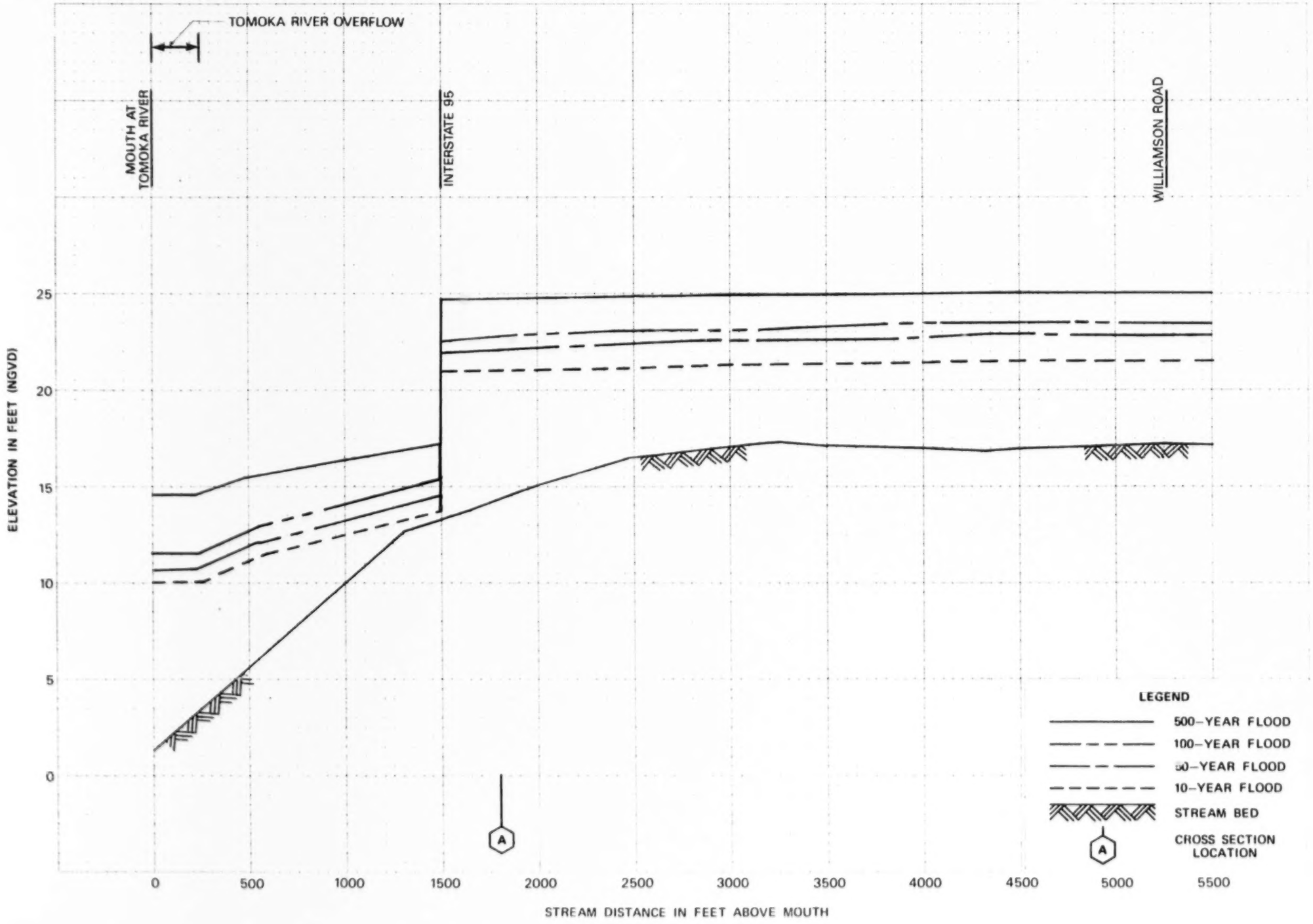
FLOOD PROFILES

TOMOKA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

03P



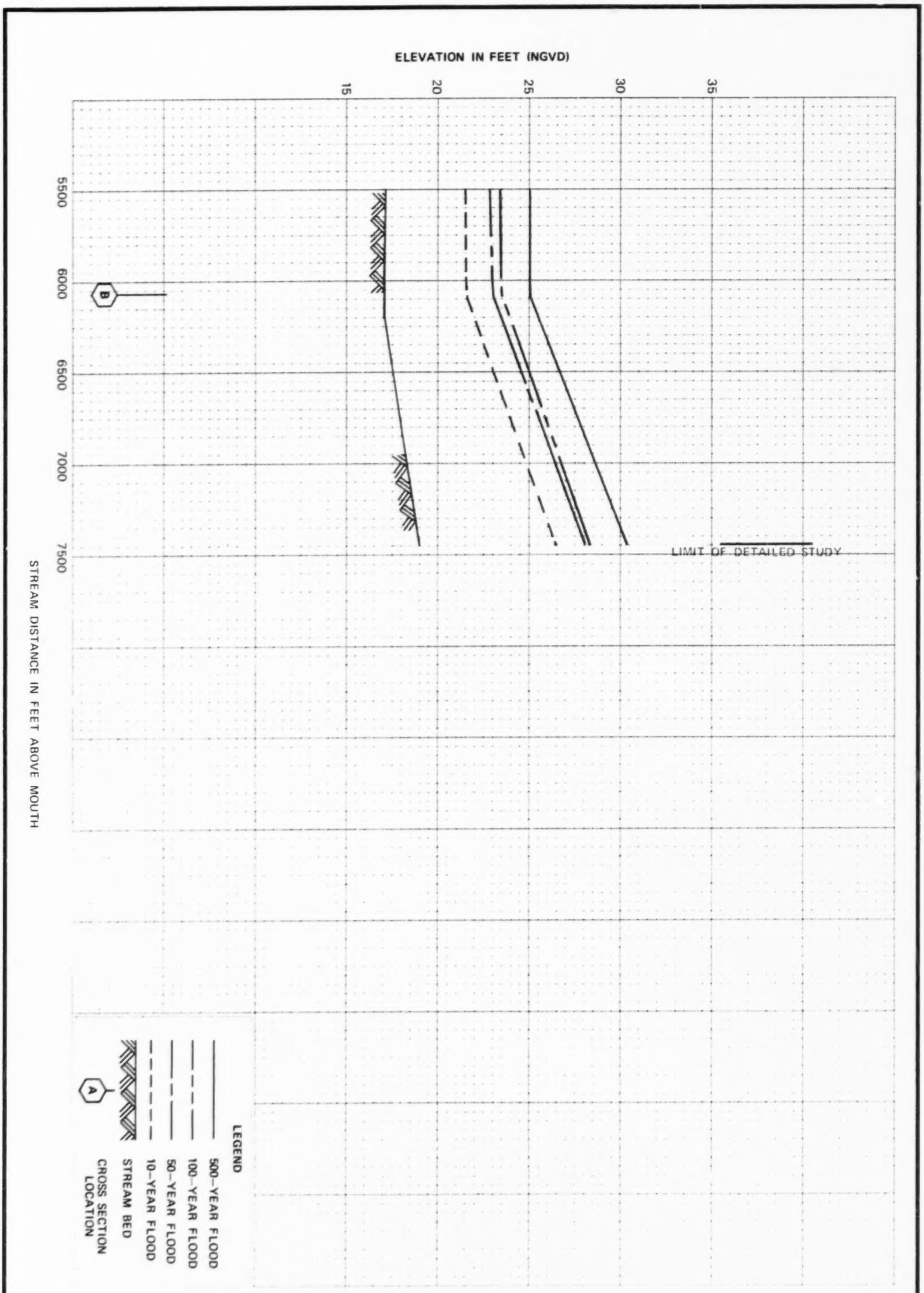
FLOOD PROFILES

SHOOTING RANGE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

04P



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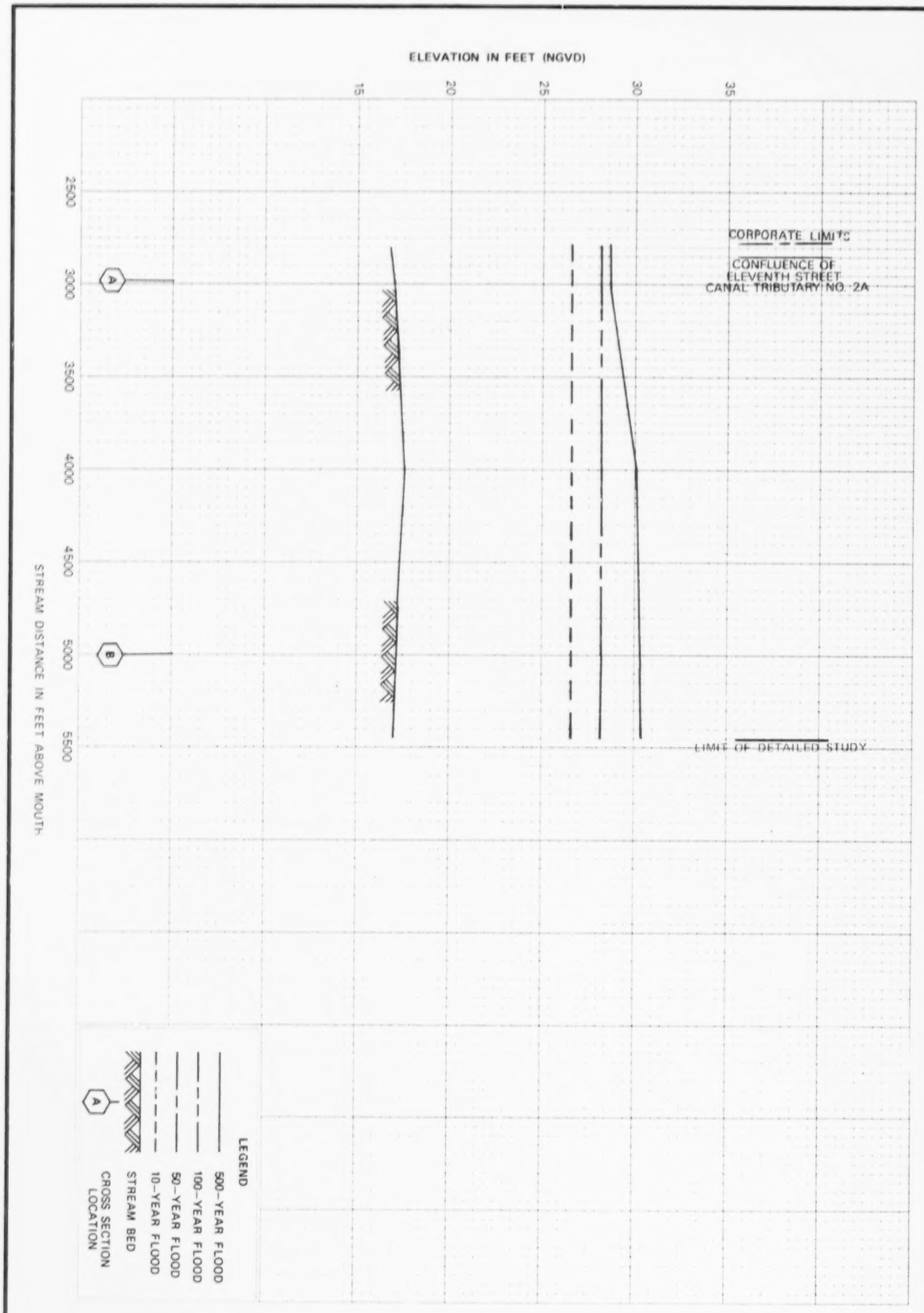
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF ORMOND BEACH, FL
(VOLUSIA CO.)

FLOOD PROFILES

SHOOTING RANGE CANAL



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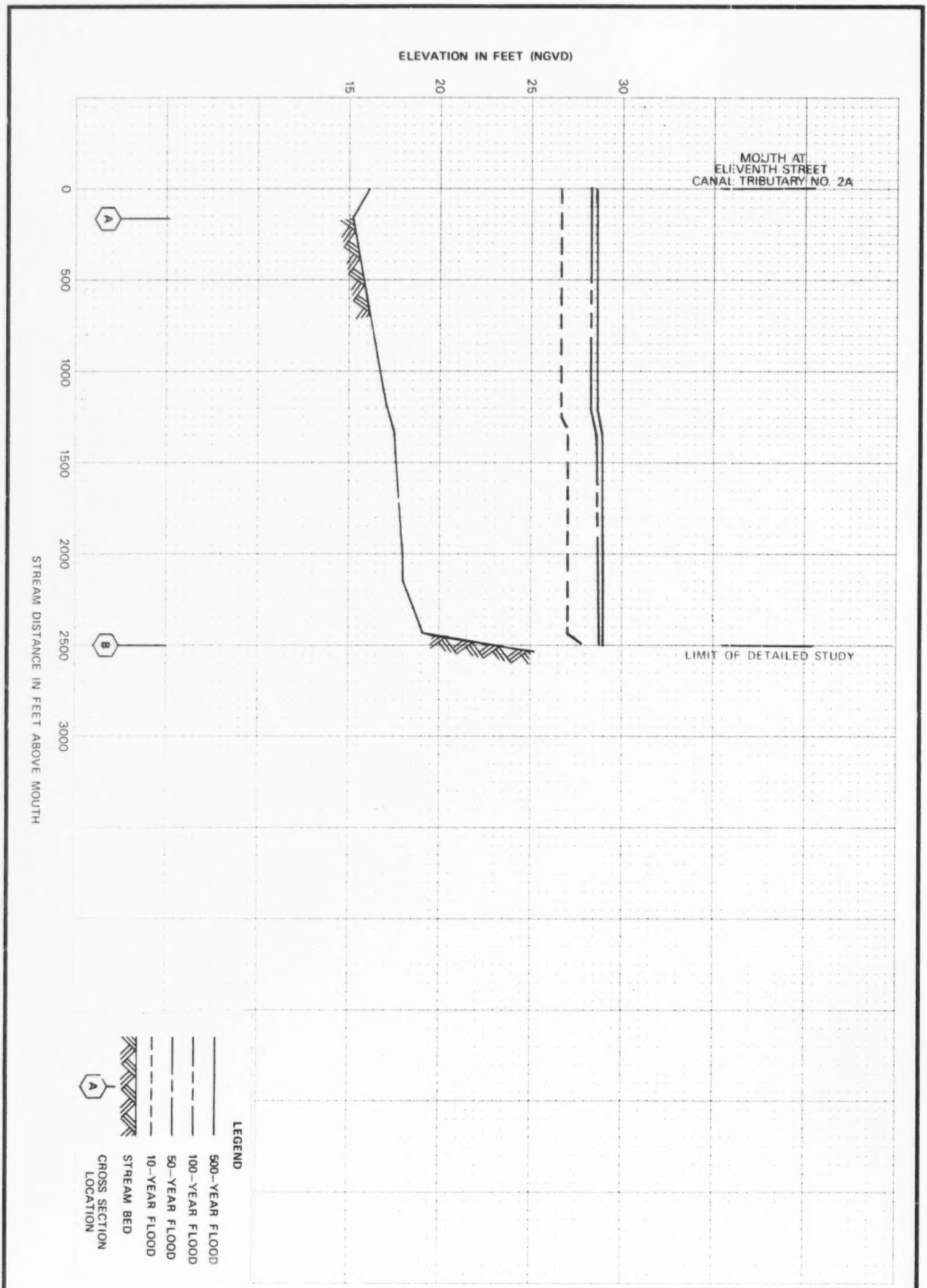

07P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF ORMOND BEACH, FL** (VOLUSIA CO.)	**FLOOD PROFILES** **ELEVENTH STREET CANAL TRIBUTARY NO. 2A**